POGORELOV, A. V., KOSEVICH, A. M., and LIFSHITS, I. M., (Khar'kov)

"The Energy spectrum of Electrons in Metals and the De-Haas-van Alphen Effect," a paper submitted at the International Conference on Physics of Magnetic Phenomena, Sverdlovsk, 23-31 May 56.

L 22639-65 EWT(d)/EWT(m)/EWP(w)/EWA(d)/EWP(v)/EWP(k)/EWA(h) Pf-4/Peb EM

ACCESSION NR: AP5001508 S/0020/64/159/005/1011/1012

AUTHOR: Pogorelov, A. V. (Corresponding member AN SSSR)

TITLE: External buckling pressure of a convex shallow shell 26

B

SOURCE: AN SSSR. Doklady, v. 159, no. 5, 1964, 1011-1012

TOPIC TAGS: shallow shell, elastic shell, strictly convex shell, plastic shell buckling pressure, shell buckling,

ABSTRACT: The buckling behavior of a thin shallow strictly convex shell under a uniform external pressure is investigated. A formula for the critical pressure is derived from equilibrium condition of the buckling shell d(U - A) = 0, where U = strain evergy obtained by variation of a functional, and A = work of internal pressure. A formula derived by this method for the buckling pressure of a sandwich shell is given. Both formulas are valid only for the case when the maximum and minimum positive curvatures of the shell are of the same order. Orig. art. has: 1 figure and 7 formulas. [02]

Card 1/2

L 22639-65
ACCESSION NR: AP5001508

ASSOCIATION: Fiziko-tekhnicheskiy institut nizkikh temperature Akademii nauk UkrSSR (Physicotechnical Institute of Low Temperatures, Academy of Sciences UkrSSR)

SUBMITTED: 23May64 ENCL: 00 SUB CODE: AS, ME

NO REF SOV: 001 OTHER: 000 ATD PRESS: 3170

Card 2/2

POGORELOV, Aleksey Vasil'yevich; BLANK, Ya.P., professor, otvetstvennyy redaktor; YANOVITSKIY, N.A., tekhnicheskiy redaktor

[Surfaces of limited external curvature] Poverkhnosti ogranichennoy vneshnei krivizny. Khar'kov, Izd-vo Khar'kovskogo ordena trudovogo krasnogo znameni gos.univ.im. A.M.Gor'kogo, 1956. 126 p. (MIRA 10:3)
(Surfaces)

16(1) PHASE I BOOK EXPLOITATION SOV/2635

Pogorelov, Aleksey Vasil'yevich

Lektsii differentsial'noy geometrii (Lectures on Differential Geometry) 2d ed. Kharkov, Izd-vo Khar'kovskogo univ., 1956. 183 p. 10,000 copies printed.

Resp. Ed.: Ya. P. Blank, Professor; Ed.: M. I. Prokopenko; Tech. Ed.: Ya. T. Chernyshenko.

PURPOSE: This book is intended as a textbook for senior students of physics and mathematics in universities.

COVERAGE: This book is based mainly on lectures given by the author in a course on differential geometry while with the Department of Mathematics and Physics at Khar'kov University. The author has attempted to give a rigorous presentation of the fundamentals of differential geometry, and of the standard methods of studying this branch of mathematics.

Card 1/~~8~~ 2

Lectures on Differential (Cont.)

SOV/2635

The book is divided into two main parts. In the first part a study is made of the theory of curves; the concept of a curve and curve concepts connected with the concepts of osculation, curvature, and torsion are discussed. In the second part a study is made of the theory of surfaces. Here the concept of a surface and surface concepts connected with the concept of osculation are discussed, as well as the first and second quadratic forms of surfaces, problems related to the theory of surfaces, the fundamental equations of the theory of surfaces, and the interior geometry of surfaces. A great amount of factual material on differential geometry is found in the numerous exercises and problems. No personalities are mentioned. There are no references.

TABLE OF CONTENTS:

Card 2/8

POGORELOV, A.V.

Transactions of the Third All-union Mathematical Congress (Cont.) Moscow Jun-Jul '56, Trudy '56, V.1. Sect. Rpts., Izdatel'stvo AN SSSR, Moscow, 1956, 237 pp.

Card 53/80

POGORELOV, A.V.

K.F. Gauss's work in the geometry of surfaces. Vop. ist.est. i tekh. no.1:61-63 '56. (MLRA 9:10)

(Gauss, Karl Friedrich, 1777-1855) (Surfaces)

SUBJECT USSR/MATHEMATICS/Geometry CARD 1/2 PG - 516
AUTHOR POGORELOV A.V.
TITLE A general characteristic property of the sphere.
PERIODICAL Uspechi mat.Nauk 11, 5, 203-206 (1956)
reviewed 1/1957

Theorem 1: A closed convex surface F is either a sphere or a spherical cylinder which is completed by two hemispheres, or the surface F admits a strong inner contact with itself, i.e. there exists a position F' of F such that F and F' possess a common outer normal n_0 in this point, where for the support function of these surfaces in the neighborhood of the point n_0 of the unit sphere the inequation

$$|H(n) - H'(n)| \geq c\,|n-n_0|^2, \qquad c>0 \text{ - constant}$$

is satisfied.
From this theorem there follows a theorem of Aleksandrov: If the principal curvatures k_1 and k_2 of a convex regular surface F satisfy the condition $f(k_1,k_2)$ = const., where f is monotone in k_1 and k_2, then F is a sphere. For the proof Aleksandrov had to assume two times continuously differentiability of F and the existence of positive derivatives

$\frac{\partial f}{\partial k_1}$ and $\frac{\partial f}{\partial k_2}$. From theorem 1 there follows the same result with the assumption of the monotony of f only.

SUBJECT USSR/MATHEMATICS/Geometry
AUTHOR POGORELOV A.V. CARD 1/1 PG - 524
TITLE A new proof of the indeformability of convex polyhedra.
PERIODICAL Uspechi Mat.Nauk 11, 5, 207-208 (1956)
reviewed 1/1957

The congruence of closed isometric convex polyhedra is proved by aid of the following lemma: Let P and P' be two isometric convex space corners, the unit vectors $\vec{e}_1,\dots,\vec{e}_n$ arise from the corner of P and run along on the edges of P. $\alpha_1,\dots,\alpha_n$ are the solid angles corresponding to these edges; $\alpha'_1,\dots,\alpha'_n$ are the corresponding solid angles of P'. Let $\vec{r}$ be an arbitrary vector running from the corner of P towards the inner of P. Then

$$\omega = \vec{r}\sum_k(\alpha_k-\alpha'_k)\,\vec{e}_k \geqslant 0.$$

The equality is reached only for the congruence of P and P'.

POGORELOV, A.V.

BLANK, Ye.P.; GORDEVSKIY, D.Z.; POGORELOV, A.V.

Geometry at Kharkov University. Uch.zap.KhGU 65:41-57 '56.
(MIRA 10:7)
(Kharkov--Geometry--Study and teaching)

CARD 1/2 PG - 26

SUBJECT USSR/MATHEMATICS/Geometry
AUTHOR POGORELOV A.V.
TITLE On the indeformability of the general infinite convex surfaces with the total curvature 2π.
PERIODICAL Doklady Akad. Nauk 106, 19-20 (1956)
reviewed 5/1956

Under the assumption that the occurring functions are differentiable for 3 times the proof for the unique definiteness by the metric in the mentioned case was carried out by the author and also by K.P. Grotemeyer. Now it is sketched for smooth surfeces. Let F, F' be equally oriented isometric surfaces of this kind; the spherical image of both be the hemisphere $z < 0$. Let Φ, Φ' be caps which are cut off from them by the plane $z = H$. By a special method of construction in connection with a former theorem of the author, the existence of analytic isometric caps Φ_n, Φ_n' with $\Phi_n \longrightarrow \Phi$; $\Phi_n' \longrightarrow \Phi'$ is guaranteed. By $z = h$ $(h < H)$, from Φ_n the cap ω_n is cut off, to which on Φ_n' there corresponds the region ω_n'. Let Ω be the Herglotz surface integral for ω_n, ω_n'. For large h and n it becomes arbitraily small. Now F, F' shall touch in a corresponding point O, O' such that corresponding directions coincide. The tangent plane is assumed as x,y-plane. This situation is called normal. For a situation being near to the normal one the surfaces $S = \frac{1}{2}(F+F'^*)$ and $S_n = \frac{1}{2}(\omega_n + \omega_n'^*)$ are formed, where the star signifies the reflection at the x,y-plane. For large h and n the absolute curvature of S_n becomes arbitrarily small as Ω. Assuming on S there would exist a closed curve γ the spherical image $\bar{\gamma}$ of which encloses a point of the sphere in its interior; γ_n shall correspond to it on S_n. For large n, its spherical image $\bar{\gamma}_n$ would enclose this point too, wherefrom would follow that the absolute curvature of S_n possesses a lower bound $\neq 0$. From this contradiction it is concluded that S is developable. From the fact that this is valid for arbitrary situations neighbored to the normal one, the author concludes that either on F.F' there must exist corresponding rectilinear lines in contradiction to the assumed smoothness, or F.F' must be congruent in the neighborhood of O,O'. But O was an arbitrary point.

POGORELOV, A.V.

2

1-F\W

Pogorelov, A. V. Continuous maps of bounded variation. Dokl. Akad. Nauk SSSR (N.S.) 111 (1956), 757–759. (Russian)

Let S and S' be surfaces in E^3 locally representable in the form $z=\varphi(x, y)$, $\varphi \in C'$. A continuous mapping f of S on S' is called of bounded variation if the sum of the measures $|f(F_k)|$ of the images $f(F_k)$ of any finite set $\{F_k\}$ of non-overlapping closed sets F_k on S is uniformly bounded. For any open set G on S the absolute variation $V_f^0(G)=\sup \sum |f(F_k)|$ for all $\{F_k\} \subset G$, and for an arbitrary set M on F we put $V_f^0(M)=\inf_{G \supset M} V_f^0(G)$. Then $V_f^0(M)$ is totally additive on the Borel sets of S. If $u_M(x)$ denotes for $x \in S'$ the number of pre-images of x in M, then $\int_{S'} u_M(x)dx = V_f^0(M)$. A point x of S is regular relative to f if it has a neighborhood U with $f(x) \neq f(y)$ for $y \in U-x$. The total variation of f vanishes on the set of non-regular points. Assume S and S' to be homeomorphic to the plane and oriented. The index of f with respect to a regular point is defined. The positive and negative variations $V_f^+(M)$ and $V_f^-(M)$ of f on M are the variations of f on the points of M with positive and negative index. The variation of f on M is defined by

$$V_f(M)=V_f^+(M)-V_f^-(M).$$

1/2

Pogorelov, A.V.

2

1-F/W

Let the domain G on S be homeomorphic to a circular disk and bounded by the curve C with $V_f^0(C)=0$. Then $V_f(G)=\int_{S'-f(C)} q_{f(C)}(x)dx$, where $q_{f(C)}(x)$ is the index or winding number of x with respect to the curve $f(C)$.

If S' is the unit sphere and f is the mapping of S on S' by parallel normals, i.e., the spherical mapping, then V_f^0, V_f, V_f^+, V_f^- become respectively the integral absolute, the integral, the positive part, the negative part of the integral extrinsic curvature, and S is a so-called surface with bounded curvature. The points with index 1, 0, -1 are the elliptic, parabolic, hyperbolic points. If the integral absolute curvature vanishes, then S is locally isometric to the plane. (Cf. the review below.)

H. Busemann (Los Angeles, Calif.).

2/2

Smw

ПОГОРЕЛОВ, А.В.

SUBJECT USSR/MATHEMATICS/Geometry

AUTHOR POGORELOV A.V. CARD 1/2 PG - 621

TITLE The extension of Gauss' theorem on spherical mappings on surfaces with bounded outer curvature.

PERIODICAL Doklady Akad.Nauk 111, 945-947 (1956) reviewed 2/1957

The author's investigations join the geometric ideas of Alexandrov (Inner geometry of the convex surfaces etc.). The following theorems are partially formulated, partially proved:

1. On each Borel set H of a surface of bounded outer curvature the outer positive curvature equals the inner positive curvature: $\sigma^+(H) = \omega^+(H)$.
2. On each Borel set H of a surface of bounded outer curvature the hegative inner curvature is not smaller than the negative outer one: $\sigma^-(H) \leq \omega^-(H)$.
3. For every Borel set on a closed surface of bounded outer curvature holds:

(1) $$\sigma^+(H) = \omega^+(H), \quad \sigma^-(H) = \omega^-(H), \quad \sigma(H) = \omega(H).$$

4. For every Borel set of a sufficiently small neighborhood of each regular point of a surface of bounded outer curvature (1) holds too. If the surface is quasiregular, then (1) holds for every H.
5. Let the surface Φ have a bounded outer and a non-negative inner curvature. If the boundary of Φ is plane, then Φ is convex. If Φ is complete, then it

Doklady Akad.Nauk 111, 945-947 (1956) CARD 2/2 PG - 621

is either closed and convex or open and convex.
6. A surface of bounded outer curvature being locally isometric to the plane, has a structure being usual for developable surfaces with rectilinear generators and stationary tangent surfaces along it. If the surface is complete, then it is cylindrical.

PHASE I BOOK EXPLOITATION 521

Pogorelov, Aleksy Vasil'yevich

Nekotoryye voprosy geometrii v tselom v rimanovom prostranstve (Problems of Geometry in the Large in a Riemann Space) Kharikov, Izd-vo Khar'kovskogo univ-ta, 1957. 89 p. 5,000 copies printed.

Ed.: Prokopenko, M.I.; Tech. Ed.: Trofimenko, A.S.

PURPOSE: The book is intended for scientific workers in mathematics, for graduate and senior students of the Faculty of Physics and Mathematics of Soviet Universities.

COVERAGE: The book contains results of the author's investigations of certain basic problems in the theory of surfaces in three-dimensional Riemannian space. In particular, he studied the problem of the isometric imbedding"in the large" of two-dimensional Riemannian manifold in a three-dimensional, the bending problem, and others. In the introduction the Soviet mathematician A.A. Aleksandrov is

Card 1/2

Problems of Geometry in the Large (Cont.) 521

mentioned. There are 7 references, 5 of which are Soviet (2 translations) 1 English and 1 German.

TABLE OF CONTENTS:

Card 2/~~6~~7

16(1) PHASE I BOOK EXPLOITATION SOV/1315

Pogorelov, Aleksey Vasil'yevich

Lektsii po analiticheskoy geometrii (Lectures on Analytical Geometry) Khar'kov, Izd-vo Khar'kovskogo univ-ta, 1957. 161 p. 10,000 copies printed.

Resp. Ed.: Blank, Ya.P., Professor; Ed.: Prokopenko, M.I.; Tech. Ed.: Trofimenko, A.S.

PURPOSE: This book is intended as a textbook for students of the physical and mathematical sciences in universities and pedagogical institutes.

COVERAGE: The book contains a brief account of the principles and methods of plane and solid analytic geometry, including a study of conics and quadric surfaces defined by equations of general form. Fundamentals of vector analysis are given with applications in solid analytic geometry. The theory of linear transformations (orthogonal, affine, and projective) in connection with conics and quadrics is presented and the concept of homogeneous and tangential coordinates is introduced. No personalities are mentioned. There are no references.

Card 1/

POGORELOV, A.V.

Theory of surfaces in the Riemannian space (with summary in English). Vest. LGU 12 no.7:156-163 '57. (MIRA 10:6)
(Surfaces) (Spaces, Generalized)

APPROVED FOR RELEASE: 06/15/2000 CIA-RDP86-00513R001341610002-3"

POGORELOV, A.V. prof. (Khar'kov)

Uniqueness of a surface with given normal curvatures. Uch. zap.KHGU 80:33-34 '57. (MIRA 12:11)
(Surfaces)

POGORELOV, A. V.

"Some Questions of Geometry in the Large in a Riemann Space."

paper submitted at International Congress Mathematicians, Edinburgh, 14 - 21 Aug 1958.

SOV/20-122-1-4/44

AUTHOR: Pogorelov, A.V.

TITLE: On Transformation of Isometric Surfaces (O preobrazovanii izometricheskikh poverkhnostiy)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 1, pp 20-21 (USSR)

ABSTRACT: In the present paper the author gives a standard method which associates to every pair of isometric surfaces of a space of constant curvature $K \neq 0$ a pair of isometric surfaces of the Euclidean space, and reversely. Let, e.g. R be a Lobachevskiy-space ($K = -1$). In R the Weierstrass coordinates x_i ($i = 0,1,2,3$) are introduced and to every point of R there has to correspond a point of the Euclidean fourdimensional space with the coordinates x_i. Here R is mapped onto the hyperboloid of two sheets $-x_0^2 + x_1^2 + x_2^2 + x_3^2 = -1$.

Theorem: Let the isometric surfaces F' and F'' with the equations $x = x'(u,v)$, $y = y'(u,v)$ (in Weierstrass' coordinates lie in R. Then in the Cartesian coordinates y_i by the equations

$$y = \frac{x'(u,v)+e_0(x'(u,v)e_0)}{e_0(x'(u,v)+x''(u,v))}$$

Card 1/2

On Transformations of Isometric Surfaces

SOV/20-122-1-4/44

$$y = \frac{x''(u,v) + e_0(x''(u,v)e_0)}{e_0(x'(u,v) \pm x''(u,v))}$$

two isometric surfaces in the Euclidean space E_0 are given. Here E_0 is the threedimensional Euclidean space $x_0 = 0$ and e_0 is the unit vector of the x_0-axis; the scalar product is taken in agreement with the form $-x_0^2 + x_1^2 + x_2^2 + x_3^2$. In addition to this theorem the author formulates its reversion and two further theorems for elliptic space (K = 1).

PRESENTED: April 30, 1958, by V.I.Smirnov, Academician

SUBMITTED: April 28, 1958

Card 2/2

AUTHOR: Pogorelov, A.V. (Kharkov) SOV/20-122-2-6/42

TITLE: On the Regularity of Convex Surfaces With Regular Metric in Spaces of Constant Curvature (O regulyarnosti vypuklykh poverkhnostey s regulyarnoy metrikoy v prostranstvakh postoyannoy krivizny)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 2, pp 186-187 (USSR)

ABSTRACT: Theorem: The metric of a convex surface in a space of constant curvature is assumed to be $k, k \geqslant 4$ times differentiable, the Gauß curvature of the surface is assumed to be positive and greater than the curvature of the space. Then the surface itself is at least (k-1) times differentiable. If the metric of the surface is analytic, then the surface itself is analytic.

By a differentiable (analytic) metric the author understands a metric, the coefficients g_{ij} of which are differentiable (analytic) in a certain coordinate system.
The demand that the Gauß curvature of the surface is positive seems to be rather unnatural for spaces of negative curvature, but it is needed for the proof of the theorem.
There are 4 Soviet references.

Card 1/2

On the Regularity of Convex Surfaces With Regular Metric in Spaces of Constant Curvature SOV/20-122-2-6/42

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet imeni A.M.Gor'kogo (Kharkov State University imeni A.M. Gor'kiy)

PRESENTED: April 30, 1958, by V.I. Smirnov, Academician

SUBMITTED: April 28, 1958

Card 2/2

16(1); 24(6) PHASE I BOOK EXPLOITATION SOV/3506

Pogorelov, Aleksey Vasil'yevich

Beskonechno malyye izgibaniya obshchikh vypuklykh poverkhnostey (Infinitesimal Deformations of Convex Surfaces) Kharkov, Izd-vo Khar'kovskogo univ., 1959. 105 p. 5,000 copies printed.

Resp. Ed.: Ya. P. Blank, Professor; Ed.: A. N. Tret'yakova; Tech. Ed.: A. S. Trofimenko.

PURPOSE: This book is intended for students in physics and mathematics departments of universities and pedagogical institutes.

COVERAGE: This book contains a proof of the fundamental theorems of infinitesimal bendings of convex surfaces without any assumptions on the regularity of the surface and the bending field. Among the topics considered are: infinitesimal bendings of general convex surfaces; fundamental lemma of bending fields of convex surfaces; the vertical component of a bending field; approximation of a bending field of a general convex surface; values of certain integrals; proof of the fundamental lemma; rigidity of convex surfaces; regularity. No personalities are mentioned. No references are given.

Card 1/4

TABLE OF CONTENTS:

POGORELOV, Aleksey Vasil'yevich; KOVALEVA, Z.G., red.; TROFIMENKO, A.S., tekhred.

[Lectures on the fundamentals of geometry] Lektsii po osnovaniiam geometrii. Khar'kov, Izd-vo Khar'kovskogo gos.univ. im. A.M.Gor'kogo, 1959. 133 p. (MIRA 13:2)
(Geometry)

16(1)

AUTHOR: ~~Pogorelov, A.V.~~ SOV/20-127-5-8/58

TITLE: A Theorem on Infinitesimal Flexures of General Convex Surfaces

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 5, pp 969-970 (USSR)

ABSTRACT: Let $F : r = r(u,v)$ be a convex surface, $\tau(u,v)$ a continuous vector field defined on F. For a continuous deformation F is assumed to pass over into $F_t : r = r(u,v) + t\,\tau(u,v)$.
Let l be the length of the curve γ on F and l_t the length of the corresponding curve γ_t on F_t. The deformation of F is denoted as infinitesimal flexure, if

$$\frac{l_t - l}{t} \to 0 \quad \text{for } t \to 0 .$$

The vector field τ is called the flexure field. The author generalizes the well-known theorems on regular convex surfaces and regular flexure fields to general convex surfaces and not absolutely regular flexure fields. The point P of a continuous surface $z = \zeta(x,y)$ is called point of rigorous convexity, if there is a plane through this point so that all the points of the surface of a sufficiently small neighborhood of

Card 1/ 2

SOV/20-127-5-8/58

A Theorem on Infinitesimal Flexures of General Convex Surfaces

P (except P) lie on one side of this plane outside of the plane. If a surface possesses no point of rigorous convexity, then the surface is called a surface of nonpositive curvature. Theorem : Let F : $z = z(x,y)$ be a general convex surface, τ its flexure field and $\zeta(x,y)$ the z-component of τ . If F contains no plane domains, then $\phi : z = \zeta(x,y)$ is a surface of nonpositive curvature. If, however, F contains plane domains G_α, then ϕ is of nonpositive curvature outside of those domains upon which the G_α are projected by the straight lines parallel with the z-axis.

For the proof the author uses essentially a result of A.D. Aleksandrov [Ref 2].

There are 2 references, 1 of which is Soviet, and 1 Japanese.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet imeni A.M.Gor'kogo (Khar'kov State University imeni A.M. Gor'kiy)

PRESENTED: April 25,1959, by V.I. Smirnov, Academician

SUBMITTED: April 23,1959

Card 2/2

16(1) SOV/20-128-3-11/58

AUTHOR: Pogorelov, A.V.

TITLE: The Rigidity of General Convex Surfaces

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 3, pp 475-477 (USSR)

ABSTRACT: The author gives results on infinitesimal deformations of convex surfaces. He neither assumes the regularity of the surface nor that of the deforming field.
Theorem 1: A general convex surface F with boundary γ which has no plane ~~ranges~~ and which can be uniquely projected upon the xy-plane is rigid in the class of deformations for which the distances of the marginal points from the xy-plane are stationary.
Theorem 2: A general closed convex surface F without plane ranges is rigid.
Theorem 4: Closed isometric general convex surfaces F and F' are identical.
Two further theorems of related contents are given.
The author mentions A.D.Aleksandrov.

Card 1/2

SOV/20-128-3-11/58

The Rigidity of General Convex Surfaces

There are 4 Soviet references.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet imeni A.M.Gor'kogo (Khar'kov State University imeni A.M.Gor'kiy)

PRESENTED: May 28, 1959, by V.I.Smirnov, Academician

SUBMITTED: May 26, 1959

Card 2/2

PHASE I BOOK EXPLOITATION SOV/5593

Pogorelov, Aleksey Vasil'yevich

K teorii vypuklykh uprugikh obolochek v zakriticheskoy stadii (On the Theory of Convex Elastic Shells in Supercritical Phase) Khar'kov, Izd-vo Khar'kovskogo univ., 1960. 78 p. 3,000 copies printed.

Resp. Ed.: Ya. P. Blank; Ed.: Z. G. Kovaleva; Tech. Ed.: A. S. Trofimenko.

PURPOSE : This book is intended for the general professional reader. It may also be useful to design engineers, students, and scientific workers concerned with the theory of shells and geometry.

COVERAGE: The author discusses the elastic states of thin-walled convex shells in supercritical phase during bulging. The main problems discussed are the determination of shape and stresses of shells as well as of the loads that could cause supercritical

Ca~~rd 1/6~~

SOV/5593

On the Theory of Convex Elastic (Cont.)

deformations. Attention is given to several topics concerned with bulging, such as the kind of deformations that take place during bulging that could be caused by a "concentrated" heavy force, the magnitude of stresses which develop during bulging, and the intensity of the force that could cause non-elastic deformations. No personalities are mentioned. There are no references.

TABLE OF CONTENTS:

Card ~~2/6~~

PHASE I BOOK EXPLOITATION SOV/4368

Pogorelov, Aleksey Vasil'yevich

Nekotoryye voprosy teorii poverkhnostey v ellipticheskom prostranstve (Some Problems in the Theory of Surfaces in an Elliptic Space) Khar'kov, Izd-vo Khar'kovskogo univ., 1960. 91 p. 3,000 copies printed.

Resp. Ed.: Ya. P. Blank, Professor; Ed.: A. N. Tret'yakova; Tech. Ed.: A. S. Trofimenko.

PURPOSE: This book is intended for students, aspirants, and scientific workers in geometry.

COVERAGE: The book deals with a number of problems in the theory of surfaces in an elliptic space associated with the consideration of isometric surfaces. Among the topics discussed are finite and infinitesimal deformations of convex surfaces and the relationship between the regularity of the intrinsic metric of a surface and the regularity of the surface itself. The basic means of investigation consist

~~Card 1/6~~

in comparing pairs of isometric objects of an elliptic space with pairs of isometric objects of a Euclidean space in geodetic correspondence with the elliptic space. This approach permits transferring the basic difficulties of proof to the Euclidean space where they can be surmounted with the aid of corresponding theorems. In Chapters I and II a brief description of the foundations of the theory of curves and surfaces in an elliptic space is given. The author points out that the results of his work can be transferred without essential changes to Lobachevskian space and that the methods used may be applied also in the investigation of isometric objects in an n-dimensional Riemannian space of constant curvature. The formulas for transformations of isometric figures, on which such an investigation may be based, remain unchanged. The author also mentions that the theorem on the regularity of a convex surface with a regular metric permits using, as is also the case in a Euclidean space, the synthetic methods of the theory of general convex surfaces of A. D. Aleksandrov. In particular, the theorem on "identification" is used for the solution of problems of the classical theory of surfaces, which usually considers sufficiently regular objects. No personalities are mentioned. There are 6 references, all Soviet.

TABLE OF CONTENTS:

SOV/5492

PHASE I BOOK EXPLOITATION

Pogorelov, Aleksey Vasil'yevich

Ob uravneniyakh Monzha-Ampera ellipticheskogo tipa (On Monge-Ampère Equations of the Elliptic Type) Khar'kov, Izd-vo Khar'kovskogo univ., 1960. 110.p. 3,000 copies printed.

Resp. Ed.: Ya. P. Blank, Professor; Ed.: Z. G. Kovaleva; Tech. Ed.: R. P. Kemchuk.

PURPOSE: This book is intended for advanced students, aspirants, and scientists working in the field of geometry and differential equations.

COVERAGE: The book contains a systematic account of a number of reports of A. D. Aleksandrov and his students on the Monge-Ampère equations of the elliptic type. In particular, the author considers boundary-value problems for these equations, problems of the uniqueness

Card ~~1/8~~

and order of generalized solutions. The exposition is characterized by a predominance of geometrical methods. The book is said to contain a number of new results pertaining to the statem nt and solution of boundary-value problems and to the problems o niqueness and order of generalized solutions. No personalities are n tioned. There are 15 references, all Soviet.

TABLE OF CONTENTS:

APPROVED FOR RELEASE: 06/15/2000 CIA-RDP86-00513R001341610002-3"

ALEKSANDROV, A.D.; POGORELOV, A.V.

Nikolai Vladimirovich Efimov; on his 50th birthday. Usp. mat. nauk 15 no.6:175-180 N-D '60. (MIRA 14:2)
(Efimov, Nikolai Vladimirovich, 1910-)

16.3500

S/020/60/132/03/13/066

AUTHOR: Pogorelov, A.V.

TITLE: On Monge - Ampère Strongly Elliptic Equations 16

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 3, pp. 535-536

TEXT: The author considers the strongly elliptic equation (Ref. 1)

$$(*) \qquad \vartheta \cdot (rt - s^2) = ar + 2bs + ct + \varphi$$

with continuous coefficients depending on x,y,z,p,q. A conditional solution of (*) is a function z(x,y) which defines a surface F convex in the direction $z<0$ which satisfies the condition $\vartheta_F = h_F + \sigma_F$ where

$$\vartheta_F(H) = \iint_H \vartheta \cdot (rt - s^2)dxdy, \quad L_F(H) = \iint_H (ar + 2bs + ct)dxdy$$

$$\text{and} \quad \sigma_F(H) = \iint_H \varphi \, dxdy .$$

Theorem 1 : Let the curve which bounds the convex domain G of the xy-plane have a positive curvature. The Dirichlet problem for the strongly elliptic

Card 1/2

81225

On Monge - Ampère Strongly Elliptic Equations S/020/60/132/03/13/066

equation

(* *) $rt - s^2 = ar + 2bs + ct + \varphi$

in G is solvable for arbitrary continuous boundary conditions if for $p^2 + q^2 \to \infty$ it holds

$$a, |b|, c < N(p^2 + q^2)^{1/2 - \alpha}, \quad \varphi < N(p^2 + q^2),$$

where $N = \text{const} < \infty$, $\alpha = \text{const} > 0$.

Theorem 1^a : Theorem 1 is valid also for $\alpha = 0$ if G is sufficiently small.

Theorem 2 : Let the coefficients of (* *) be differentiable with respect to all variables ; let the coefficient φ and the form $a\xi^2 + 2b\xi y + cy^2$ be non-decreasing as functions of z . Then two arbitrary conditional solutions of (* *) which agree on the boundary of G, are identical in G.

Theorem 3 asserts that for sufficiently regular coefficients the conditional solution is also regular. The author mentions I.Ya.Bakel'man. There is 1 Soviet reference.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet imeni A.M. Gor'kogo (Khar'kov State University imeni A.M. Gor'kiy)

PRESENTED: December 14, 1959, by V.I. Smirnov, Academician

SUBMITTED: December 11, 1959

Card 2/2

S/020/60/133/04/09/031
B019/B060

AUTHOR: Pogorelov, A. V.

TITLE: On Elastic Deformations of Convex Shells in the Transcritical Region

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 4, pp. 785-787

TEXT: The author studied the deformation of a convex shell, where the shell appears considerably different from its original shape. The author defines this deformed state as transcritical, and divides the energy of elastic deformation related to the bulging of a shell in a region G bounded by the curve γ, into two parts: U_G and U_γ. The energy U_G is related to the fact that the shell is "turned inside out" in the region of deformation. The energy U_γ is determined by the local inflection at the boundary of the region of deformation. Expressions are derived for both energies, and the author obtains from the equilibrium condition $dA_G = dU_\gamma + dU_G$, (where dA_G is the elementary work of the external stress) a relation between the

Card 1/2

On Elastic Deformations of Convex Shells in the the Transcritical Region

S/020/60/133/04/09/031
B019/B060

external stress, and the bulging. A relation is then obtained for the surface stress in the case of a slight bulging. Next, an estimation is made of the lower critical stress, by assuming the shell to be in a stable state of equilibrium. It is finally stated that the results obtained here allow the determination of deformation under a given force, the stress, the effect of a coercive bulging on the upper critical stress, and the distribution of rigid elements on the shell.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet im. A. M. Gor'kogo (Khar'kov State University im. A. M. Gor'kiy)

PRESENTED: February 1, 1960, by I. N. Vekua, Academician

SUBMITTED: February 1, 1960

Card 2/2

S/020/60/134/001/002/021
B019/B060

AUTHOR: Pogorelov, A. V., Corresponding Member of the AS USSR

TITLE: Transcritical Deformations of Compressed Cylindrical Shells

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 134, No. 1, pp. 62-63

TEXT: The results obtained from a study of the transcritical elastic state of a compressed cylindrical shell are discussed here. The transition of the shell to the elastic transcritical state is described, and the amount of the lower critical stress is determined. The surface of the shell is assumed to undergo geometrical deflection on its transition to the transcritical state, so that the surface exhibits a periodic deformation (Fig. 1). The character of periodicity is described by two parameters, m and n: the bending energy U of deformation can be divided into two parts, U_γ being the part caused by strong local deflections along the bending waves, U_Δ the bending energy in the remaining part of the shell surface. The latter can be determined in the

Card 1/3

Transcritical Deformations of Compressed Cylindrical Shells

S/020/60/134/001/002/021
B019/B060

usual way, i.e., from the bending deformation of the initial surface. The formula used by the author for determining U_γ had already been derived by himself in a previous paper (Ref. 2). The determination of function y(x), which expresses the form of the wave-like deformed surface of the shell with the aid of m and n, is solved as a variation problem for a given axial compression. In this way, the energy of the elastic deformation of the shell is obtained as a function of the compression h and the parameters m and n. Furthermore, the character of the periodicity of deformation is assumed to be maintained on the transition to the transcritical state. The parameters which describe the wave-like deformation at the moment of the loss of elasticity, are not independent but related to one another by several relations. U can thus be expressed as a function of h and ξ. The conditions are next investigated under which there arise stable transcritical states. These are only possible with $\xi < 0.91$; the formula $p_c^* = 0.15E\delta/R$ is given for the lower critical stress. R denotes radius of the shell, δ is its thickness, and E is the modulus of elasticity. The results given here were derived for unbounded shells, and they can be used solely in real cases for

Card 2/3

Transcritical Deformations of Compressed Cylindrical Shells

S/020/60/134/001/002/021
B019/B060

sufficiently thin shells. Specifically, the formula for p_c^* can be used only if the stress $\sigma = 3E\delta/R$ does not give rise to stronger plastic deformations. Finally, the author points out that a study of the transcritical state of equilibrium of relatively thick shells is not possible without considering plastic deformations. There are 1 figure and 2 Soviet references.

SUBMITTED: April 25, 1960

Card 3/3

POGORELOV, ~~Aleksey Vasil'yevich~~; BLANK, Ya.P., otv. red.; KOVALEVA, Z.G., red.; SEMASHKO, Yu.Yu., tekhn. red.

[Some results in geometry in the large] Nekotorye rezul'taty po geometrii v tselom. Khar'kov, Izd-vo Khar'kovskogo gos. univ., 1961. 88 p. (MIRA 15:2)

(Geometry)

POGORELOV, Aleksey Vasil'yevich; BLANK, Ya.P., prof., otv. red.; PROKOPENKO, M.I., red.; CHERNYSHENKO, Ya.T., tekhn. red.

[Lectures on differential geometry] Lektsii po differentsial'noi geometrii. Izd.3. Khar'kov, Izd-vo Khar'kovskogo gos. univ. im. A.M.Gor'kogo, 1961. 165 p. (MIRA 15:2)
(Geometry, Differential)

POGORELOV, A.V.

Regularity of convex surfaces with a regular metric in Locbachevskii space. Dokl. AN SSSR 137 no. 1:35-38 Mr-Ap '61. (MIRA 14:2)

1. Fiziko-tekhnicheskiy institut nizkikh temperatur Akademii nauk USSR. Chlen-korrespondent AN SSSR.
(Surfaces)

POGORELOV, A.V.

Isometric immersion in the large of a two-dimensional Riemanni manifold into a three-dimensional one. Dokl. AN SSSR 137 no.2: 282-283 Mr '61. (MIRA 14:2)

1. Fiziko-tekhnicheskiy institut nizkikh temperatur AN USSR. Chlen-korrespondent AN SSSR.

(Spaces, Generalized)

POGORELOV, A.V.

Isometric transformations of dotted convex surfaces. Dokl.AN SSSR 137 no.6:1307-1308 Ap '61. (MIRA 14:4)

1. Fiziko-tekhnicheskiy institut nizkikh temperatur AN USSR. Chlen-korrespondent AN SSSR (for Pogorelov).
(Surfaces) (Transformations (Mathematics))

POGORELOV, A.V.

Rigidity of closed surfaces nonhomeomorphic to a sphere in Riemann space. Dokl.AN SSSR 138 no.1:51-52 My-Je '61. (MIRA 14:4)

1. Fiziko-tekhnicheskiy institut nizkukh temperatur AN USSR.
2. Chlen-korrespondent AN SSSR.

(Riemann surfaces)

25333

.24 4200

11.2313

S/020/61/138/006/009/019
B104/B214

AUTHOR: Pogorelov, A. V., Corresponding Member of the AS USSR

TITLE: Transcritical deformations of cylindrical shells under external pressure

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 138, no. 6, 1961, 1325 - 1327

TEXT: The results are given here of an investigation of elastic transcritical deformations of cylindrical shells fastened at the boundaries by hinges and subjected to the action of an external pressure uniformly distributed over the surface. That deformation is designated as transcritical for which the deformation of the shell is comparable to its geometric dimensions. Therefore, for this investigation a nonlinear theory is used and the problem consists in the calculation of that load of a shell at which its solidity is not yet lost. The lower and upper transcritical loads q_i, q_e are defined and a discussion is given of the method used by the author for the approximation of the form of the shell which is in transcritical elastic equilibrium. For this the transcritical de-

Card 1/4

25332

S/020/ 1/138/006/009/019
B104/B214

formation is assumed to be a geometric deflection. This assumption is
justified by the fact that the inner deformation of the averaged surface
of the shell and the elastic deformation are small. It is further assumed
that the transcritical deformation at the instant of its formation is a
wave formation of the surface of the shell. On the shell on transcritical
deformation is reproduced by an isothermal cylinder Z up to an accuracy
of a function of one variable. The author obtains this function from
energy equations where he starts from the condition of the energy mini-
mum of the elastic deformation of the shell into the form Z for a fixed
work A. A is transferred by the external force. By minimizing the ener-
gy of the elastic deformation for fixed A the author finds the form Z of
the shell and the energy U as functions of the parameter λ characterizing
the deformation. In the discussion of the results the author divides all
cylindrical shells in three classes according to the following two con-
ditions: Condition A: $R\delta/L^2 \ll 1$ (δ is the thickness of the shell, R its
radius and L its length). Condition B: $0.4E(\delta/R)(R\delta/L^2)^{-1/2} < \sigma_B$ (E is the
modulus of elasticity of the shell material, σ_B is its

25333

tensile strength). The shells of the first class do not satisfy A. This class is not investigated. The second class satisfies A but not B. The transcritical deformations of the shell lead here to plastic deformations of the material. q_i lies closer to q_e. Those shells are placed in class three which satisfy A and B. The transcritical state of equilibrium is elastic for these shells. It could be shown that in the first stage of the transcritical deformation the equilibrium state of a thin shell which loses the stability of the cylindrical form is unstable. If the edges appearing in the cylindrical surface on this deformation approach one another the second stage of the transcritical deformation begins, in which the equilibrium state is stable. If the external load of the shell is characterized by $\bar{q} = qR^2/E\delta^2$ the following holds for the lower critical load:

$$\bar{q}_i^o = \bar{q}_e^o (2\varepsilon^{1/3} + 1.5\varepsilon^{1/2}), \; = R\delta/L^2.$$

$\bar{q}_e^o = 0.86\varepsilon^{1/2}$ is the upper critical load. If an axial pressure exists and is characterized by $\bar{p} = pR/E\delta$ the lower critical pressure is given

25333

Transcritical deformations of... S/020/61/138/006/009/019
B104/B214

by $\bar{q}_1 = \bar{q}_1^0 - 7.75\varepsilon^{1/2}\bar{p}$, where $\bar{q}_1^0$ is the critical pressure in the absence of an axial pressure. There are 1 figure and 3 Soviet-bloc references.

ASSOCIATION: Fiziko-tekhnicheskiy institut nizkikh temperatur Akademii nauk USSR (Institute of Physics and Technology of Low Temperatures of Academy of Sciences UkrSSR)

SUBMITTED: March 25, 1961

Card 4/4

POGORELOV, A.V.

Isometric imbedding of a two-dimensional Riemann manifold homeomorphous to a sphere into a three-dimensional Riemann space. Dokl. AN SSSR 139 no.4:818-820 Ag '61. (MIRA 14:7)

1. Chlen-korrespondent AN SSSR.
(Conformal mapping) (Spaces, generalized)

POGORELOV, A.V.

Regularity of a convex surface with a regu'er metric in Euclidean space. Dokl. AN SSSR 139 no.5:1056-.058 Ag '61.
(MIRA 14:8)

1. Fiziko-tekhnicheskiy institut nizkikh temperatur AN USSR.
2. Chlen-korrespondent AN SSSR (for Pogorelov).
(Convex surfaces) (Distance geometry)

POGORELOV, A. V.

"On the isometric immersion of a two-dimensional Riemannian manifold into a three-dimensional Riemannian space"

report submitted at the Intl Conf of Mathematics, Stockholm, Sweden, 15-22 Aug 62

10.7200

32831
S/020/62/142/002/009/029
B104/B138

AUTHOR: Pogorelov, A. V., Corresponding Member AS USSR

TITLE: Transcritical deformations of cylindrical shells under torsion

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 142, no. 2, 1962, 302-303

TEXT: The present study is based on three premises: (1) The transcritical elastic deformation of shells is basically geometric; (2) the periodicity of the shell shape in transcritical deformation determines the periodicity of deformations while stability is being destroyed; (3) the passage of shells to transcritical deformations is associated with the appearance of marked ribs on the shell surface. Results: (1) A cylindrical shell of radius R, length L, and thickness δ loses its stability under the action of a uniformly distributed tangential stress s if $s_e \simeq 0.8E\frac{\delta}{R}(R\delta/L^2)^{1/4}$; (2) on the passage of the shell to transcritical deformation, the bearable load diminishes to a minimum s_i, and thereupon grows again. The passage to the transcritical deformation under a load

Card 1/2

32831

S/020/62/142/002/009/029
B104/B138

that causes the loss of stability is accompanied by a "bang"; (3) if the geometrical dimensions and the mechanical characteristics of the material satisfy the condition $3.6E\delta/R < \sigma_B$ (E is the modulus of elasticity, σ_B is the tensile stress, the least load with transcritical deformation, i.e., the least critical load will be
$s_i \simeq 0.2E \frac{\delta}{R}(R\delta/L^2)^{1/4}$. There are 1 figure and 2 Soviet references.

ASSOCIATION: Fiziko-tekhnicheskiy institut nizkikh temperatur Akademii nauk USSR (Physicotechnical Institute of Low Temperatures of the Academy of Sciences UkrSSR)

SUBMITTED: September 1, 1961

POGORELOV, A.V.

Loss of stability of a shell of revolution under external pressure uniformly distributed along a parallel. Dokl. AN SSSR 151 no.6: 1303-1305 Ag '63. (MIRA 16:10)

1. Fiziko-tekhnicheskiy institut nizkikh temperatur AN UkrSSR; chlen-korrespondent AN SSSR.

POGORELOV, Aleksey Vasil'yevich; BLANK, Ya.P., prof., otv. red.; BAZILYANSKAYA, I.L., red.

[Strictly bulged shells in the case of post critical deformations] Strogo vypuklye obolochki pri zakriticheskikh deformatsiiakh. Khar'kov, Izd-vo Khar'kovskogo gos. univ. Pt.2. 1965. 78 p. (MIRA 19:1)

L 20706-66 EWT(d)/EWT(m)/EWP(w)/EWP(v)/EWP(k)/EWA(h)/ETC(m)-6 IJP(c) WW/EM

ACC NR: AP6012023 SOURCE CODE: UR/0020/65/160/006/1283/1284

AUTHOR: Pogorelov, A. V. (Corresponding member AN SSSR)

ORG: Physicotechnical Institute of Low Temperatures, AN SSSR (Fiziko-tekhnicheskiy institut nizkikh temperatur AN SSSR)

36

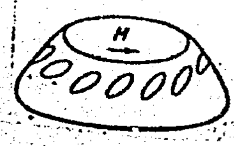
B

TITLE: Loss of stability by rotational shells 21 in torsion 26

SOURCE: AN SSSR. Doklady, v. 160, no. 6, 1965, 1283-1284

TOPIC TAGS: shell structure dynamics, elastic modulus, sheel buckling

ABSTRACT: Suppose that a strictly convex rotational shell is acted upon by moment M, created by uniformly distributed tangential stresses along the edge of the shell. When moment M reaches a certain critical value, the shell loses stability and there arises on its surface a system of dents in a regular array along the parallel, as shown in the Figure. The problem is to determine this critical value of the moment M. In view of the fact that the load being taken by the shell at the moment when stability is lost is stationary, the critical value of M may be defined as the moment being absorbed by the shell under conditions of appreciable buckling. The article finds that the critical value of M is determined according to the formula



$$M_{\kappa} = \frac{\pi \rho^{3} E \delta^{3}}{\sqrt{12(1-\nu^{2})}\sqrt{R_{1}R_{2}}}$$

Card 1/2

2

L 20706-66

ACC NR: AP6012023

where ρ is the radius of the parallel on which the centers of the regions of buckling are situated, E the modulus of elasticity, ν Poisson's ratio, δ the thickness of the shell, and R_1 and R_2 the main radii of curvature in the centers of the regions of buckling. [JPRS]

SUB CODE: 13, 20 / SUBM DATE: 27Nov64 / ORIG REF: 001

Card 2/2 BK

ACC NR: AM6008488 (A) Monograph UR/

Pogorelov, Aleksey Vasil'yevich

Highly convex shells during supercritical deformations. no. 2: Loss of stability of shells (Strogo vypuklyye obolochki pri zakriticheskikh deformatsiyakh. vyp. 2: Poterya ustoychivosti obolochek) Kharkov, Izd-vo Khar'k. univ., 1965. 78 p. illus., biblio. 1,5000 copies printed.

TOPIC TAGS: shell structure, shell structure stability, shell deformation, critical pressure

PURPOSE AND COVERAGE: This book presents a new method of studying the problem of stability of highly convex shells. During various means of leading, the critical value of load is determined. This book can be useful for construction engineers, scientists, students and aspirants in corresponding specialties.

TABLE OF CONTENTS (abridged):

Card 1/2

UDC: NONE

ACC NR: AM6008488

SUB CODE: 20 SUBM DATE: 30Jan65 ORIG REF: 002

Card 2/2

ACC NR: AP6036753 SOURCE CODE: UR/0020/66/171/001/0059/0060

AUTHOR: Pogorelov, A. V. (Corresponding member AN SSSR)

ORG: Physicotechnical Institute of Low Temperatures, Academy of Sciences UkrSSR (Fiziko-tekhnicheskiy institut nizkikh temperatur Akademii nauk UkrSSR)

TITLE: General critically-stressed state of a strictly convex shell

SOURCE: AN SSSR. Doklady, v. 171, no. 1, 1966, 59-60

TOPIC TAGS: shell design, shell buckling, shallow shell, elastic stress, stress distribution

ABSTRACT: The author considers a strictly convex shallow shell which is in a basic stressed state under the influence of an arbitrary load distributed along its edge. The purpose of the investigation is to ascertain under what values of the stress can the shell become unstable and buckle outward. The analysis is based on determining the work performed by the external load during the shell deformation, using the concept of global deformation of the metric of the surface during the buckling of a set of regions on the shell. The buckling regions are assumed to be uniformly distributed over the shell. The calculations are based on results presented in the author's book (Geometricheskaya teoriya ustoychivosti obolochek [Geometric Theory of Shell Stability] Nauka, 1966). An expression is derived for the condition under which the stressed

Card 1/2 UDC: 539.3

ACC NR: AP6036753

state is critical, in terms of the radii of the normal curvature along the principal directions on the surface, the stress components in the principal directions, the shell thickness, the modulus of elasticity, and the Poisson coefficient. Orig. art. has: 1 figure and 7 formulas.

SUB CODE: 20, 11/ SUBM DATE: 12May66/ ORIG REF: 001

ACC NR: AP6036837 SOURCE CODE: UR/0020/66/171/002/0310/0312

AUTHOR: Pogorelov, A. V. (Corresponding member AN SSSR)

ORG: Physico-technical Institute for Low Temperatures, Academy of Sciences UkrSSR (Fiziko-tekhnicheskiy institut nizkikh temperatur Akademii nauk UkrSSR)

TITLE: Energy of transcritical deformation of a thin elastic shell

SOURCE: AN SSSR. Doklady, v. 171, no. 2, 1966, 310-312

TOPIC TAGS: shell deformation, static load test, elasticity theory

ABSTRACT: The author investigated the effect of clamping the rim of a shell on the energy of its deformation, under the assumption of nearness of the rim to the edge of the isometric transformation of the initial shape of the middle surface. The problem is similar to that treated in the author's book "Geometric Theory of Shell Stability" (Geometricheskaya teoriya ustoichivosti obolochek) "Nauka", 1966, differing from it only in the mentioned assumption. The deformation energy per unit length of the edge is obtained by minimization of the total energy of deformation. The theoretical results agree well with the experimental data given in the book. The results are used for determination of the value of the lower critical pressure on a slanted spherical segment rigidly clamped at the rim. Orig. art. has: 2 figures and 10 equations.

SUB CODE: 20/ SUBM DATE: 12May66/ ORIG REF: 001

BLANK, Ya.P.; POGORELOV, A.V.

Second All-Union Conference on Geometry. Usp. mat. nauk. 20 no.4:216-218 Jl-Ag '65. (MIRA 18:8)

L 3401-66 EWT(d)/EWT(m)/EWP(w)/EWP(v)/EWP(k)/EWA(h)/ETC(m) WW/EM

ACCESSION NR: AP5024205 UR/0020/65/164/003/0523/0524

29
28

AUTHOR: Pogorelov, A. V. (Corresponding member AN SSSR)

B

TITLE: Critical external pressure on the ellipsoidal bottom of a cylindrical reservoir

SOURCE: AN SSSR. Doklady, v. 164, no. 3, 1965, 523-524

26

TOPIC TAGS: critical load, pressure distribution, elastic deformation

ABSTRACT: A formula is derived for the critical pressure on the ellipsoidal bottom of a cylindrical reservoir as shown in Fig. 1 on the Enclosure. The deformation energy of the reservoir bottom is given by

$$U = 2\pi c E \delta^{5/2} a^{1/2} \rho^{1/2},$$

where ρ is the radius of the protuding section of the bottom. The condition for elastic equilibrium is given by the equation

$$\frac{d}{d\rho}(U - A) = 0,$$

where A = pV. For a given curvature k for the bottom, the magnitudes for U and A

Card 1/3

L 3401-66

ACCESSION NR: AP5024205

are substituted in the equilibrium equation and the following formula is obtained for the critical pressure

$$p = \frac{1}{2} cE \left(\frac{\delta}{\rho}\right)^{1/2} \alpha^{1/2} \left(5 \frac{\rho}{a} k + 1\right),$$

Orig. art. has: 13 formulas and 1 figure.

ASSOCIATION: Fiziko-tekhnicheskiy institut nizkikh temperatur, Akademii nauk UkrSSR (Physico-Technical Institute for Low Temperatures, Academy of Sciences, UkrSSR)

SUBMITTED: 28May65 ENCL: 01 SUB CODE: ME

NO REF SOV: 001 OTHER: 000

Card 2/3

L 3401-66

ACCESSION NR: AP5024205

ENCLOSURE: 01

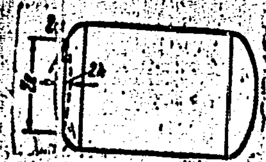


Fig. 1

Card 3/3

POGORELOV, A.V.

Loss of stability by shells of revolution under internal pressure. Dokl. AN SSSR 159 no.6:1247-1248 D '64 (MIRA 18:1)

1. Fiziko-tekhnicheskiy institut nizkikh temperatur AN UkrSSR; chlen-korrespondent AN SSSR.

POGORELOV, A.V.

Critical external pressure on a convex shallow shell. Dokl. AN SSSR 159 no.5:1011-1012 D '64 (MIRA 18:1)

1. Fiziko-tekhnicheskiy institut nizkikh temperatur AN UkrSSR; chlen-korrespondent AN SSSR.

L 20077-65 EWA(h)/EWP(k)/EWT(l)/EWT(m)/EWA(d)/EWP(w)/EWP(v)/ Pf-4/Peb
ASD(f)-3/AFTC(p) EM/MLK

ACCESSION NR AM5001003 BOOK EXPLOITATION S/

Pogorelov, Aleksey Vasil'yevich

Post-buckling behavior of cylindrical shells. no. 4: Finite elastic shells. Panels. Orthotropic shells (TSilindricheskiye obolochki pri zakriticheskikh deformatsiyakh. [vy'p] IV: Ogranichenno uprugiye obolochki. Paneli. Ortotropny'ye obolochki), Khar'kov, Izd-vo Khar'kovskogo univ., 1963, 93 p. illus., biblio. 3,000 copies printed.

TOPIC TAGS: cylindrical shell, panel, orthotropic shell, finite elastic shell

PURPOSE AND COVERAGE: This book is devoted to an investigation of the post-buckling behavior of thin shells after loss of rigidity and continues the research of the author published in the publishing house of KhGU, "Cylindrical shells and post-buckling behavior", Nrs. I-III (TSilindricheskiye obolochki pri zakriticheskikh deformatsiyakh, vyp. I-III). In this work, the new promising method of investigating and calculating shells is developed. The author proposes the solution of a number of difficult problems in modern shell theory. The presentation is basically elementary and intended for a wide audience who understand the elements of shell theory and

Card 1/2

L 20077-65
ACCESSION NR AM5001003

differential geometry. The book can be useful to engineers, designers, students, and researchers in shell theory.

TABLE OF CONTENTS [abridged]:

SUB CODE: AS SUBMITTED: 28May63 NR REF SOV: 005

OTHER: 000

Card 2/2

L 19043-65 EWT(d)/EWT(m)/EWP(w)/EWA(d)/EWP(v)/EWP(k)/EWA(h) Pf-4/Peb
ASD(f)-2 EM

ACCESSION NR: AP5001980 S/0020/64/159/006/1247/1248

AUTHOR: Pogorelov, A. V. (Corresponding member AN SSSR)

TITLE: Buckling of shells of revolution under internal pressure

SOURCE: AN SSSR. Doklady, v. 159, no. 6, 1964, 1247-1248

TOPIC TAGS: shell of revolution, shell buckling, internal buckling pressure, internal shell buckling pressure

ABSTRACT: The results of an analytical investigation of the buckling of shells of revolution caused by internal pressure are presented. The investigation is based mainly on geometrical considerations. Expressions for the buckling strain energy U, and the work A spent in buckling (internal pressure multiplied by the change in the volume of the shell) are determined and a formula for the critical pressure is derived from the equilibrium condition d(U-A)=0 by differentiating this equation with respect to a buckling-dimension parameter. Formulas are also given for the buckling pressure for a flattened ellipsoid, a strictly convex shell of revolution, and a closed spherical shell. Orig. art. has: 11 equations and 1 figure.

Card 1/2

L 19043-65

ACCESSION NR: AP5001980

ASSOCIATION: Fiziko-technicheskiy institut nizkikh temperatur Akademii nauk UkrSSR (Physicotechnical Institute of Low Temperatures, Academy of Sciences, Ukr SSR)

SUBMITTED: 26Jun64 ENCL: 00 SUB CODE: AS

NO REF SOV: 001 OTHER: 000 ATD PRESS: 3157

Card 2/2

POGORELOV, Aleksey Vasil'yevich; BLANK, Ya.P., prof., otv. red.; SEMASHKO, A.A., red.

[Cylindical shells at supercritical deformations] TSilindricheskie obolochki pri zakriticheskikh deformatsiiakh. Khar'kov, Izd-vo Khar'kovskogo univ. No.4. [Limitedly elastic shells, panels, orthotropic shells] Ogranichenno-uprugie obolochki paneli; ortotropnye obolochki. 1963. 92 p. (MIRA 17:10)

POGORELOV, A.V.

Loss of stability by a convex shell under the pressure of a tightly stretched thread. Dokl. AN SSSR 156 no. 5:1064 Je '64. (MIRA 17:6)

1. Fiziko-tekhnicheskiy institut nizkikh temperatur AN UkrSSR; chlen-korrespondent AN SSSR.

POGORELOV, A.V.

Stability of axisymmetric deformations of spherical shells under axisymmetric load. Dokl. AN SSSR 151 no.5:1053-1055 Ag '63.
(MIRA 16:9)

1. Fiziko-tekhnicheskiy institut nizkikh temperatur AN UkrSSR; chlen-korrespondent AN SSSR.
(Elastic plates and shells) (Deformations (Mechanics))

L 16983-63 EWP(r)/EWP(q)/EWT(m)/BDS AFFTC/ASD JD

S/020/63/149/005/005/018 55 54

AUTHOR: Pogorelov, A.V., Corresponding Member of the Academy of [redacted]

TITLE: On the lower critical load for cylindical shells 26

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 149, no. 5, 1963, 1047-1048

TEXT: In the previous papers of the author several formulas were obtained for lower critical load under axial pressure

$$p_l = 0{,}18E\frac{\delta}{R},$$

where R is the radius, δ is the thickness and E is the module of elasticity. The formula is applicable to shells with finite elasticity if $2{,}5E\frac{\delta}{R} < \sigma_{\text{в}}$,

where σ_t denotes the time resistance.

The author considers shells comparatively thick e.g. shells for which under axial pressure

$$\sigma_t < 2{,}5E\frac{\delta}{R}.$$

The author assumes that in the process of super-critical deformation the tension from the point of deformation along the edges is not higher than the time resistance σ_t. Under this condition the following formula is found for lower critical load under axial pressure

$$p_l = \bar{p}_l E\frac{\delta}{R},$$

Card 1/2

L 16983-63

S/020/63/149/005/005/018

On the lower critical load...

where $\bar{p}_i$ is given as an explicit function of ω and ω is given by

$$\omega = 0,6\frac{\sigma_s R}{E\delta}.$$

The author gives several other formulas under assumption of infinite elasticity of the material.

ASSOCIATION: Fiziko-tekhnicheskiy nizkikh temperatur akademii nauk USSR (Physical-Technical Institute of Low Temperatures, Ukrainian Academy of Sciences).

SUBMITTED: November 14, 1962

Card 2/2

POGORELOV, A.V.

Loss of stability by shells of rotation due to torsion. Dokl. AN SSSR 160 no.6:1283-1284 F '65. (MIRA 18:2)

1. Fiziko-tekhnicheskiy institut nizkikh temperatur AN SSSR; chlen-korrespondent AN SSSR.

L 15470-63 EWP(r)/EWT(m)/BDS AFFTC EM

APPROVED FOR RELEASE: 06/15/2000 CIA-RDP86-00513R001341610002-3"

ACCESSION NR: AP3005429 S/0020/63/151/005/1053/1055 54

AUTHOR: Pogorelov, A. V. (Corr. member Academy of Sciences SSSR) 53

TITLE: Stability of axisymmetric deformations of spherical shells 14 under axisymmetric loads 14

SOURCE: AN SSSR. Doklady*, v. 151, no. 5, 1963, 1053-1055

TOPIC TAGS: elastic deformation, elasticity theory, shell deformation stability, axisymmetric deformation

ABSTRACT: Some results on stability of spherical shells for two methods of loading are given: by a concentrated force and by uniform external pressure. The general considerations of the method were given in previous publications of the author (particularly, "The theory of elastic shells under supercritical deformations", Kharkov, 1960). The results of computations for both types of loading are the same. The bulging of the shell in the form of a circle is stable until the radius of the circle reaches a certain value. The critical

Card 1/2

L 15470-63

ACCESSION NR: AP3005429

force is a function of this radius and of the shell thickness. After that, the circle is transformed into a triangle with rounded vortices. Orig. art. has: 2 figures and 7 formulas.

ASSOCIATION: Fiziko-tekhnicheskiy institut nizkikh temperatur Akademii nauk UkSSR (Low temperature physics engineering institute, Academy of sciences, UkrSSR)

SUBMITTED: 17May63   DATE ACQ: 06Sep63   ENCL: 00

SUB CODE: ML, PH   NO REF SOV: 001   OTHER: 000

Card 2/2

L 18960-63 EWP(q)/EWT(m)/BDS/EWT(d)/EWP(r) AFFTC/ASD JD

ACCESSION NR: AP3006587 S/0020/63/151/006/1303/1305

AUTHOR: Pogorelov, A. V. (Corr. Mem., AS, SSSR)

57
55

TITLE: Loss of stability of a shell 26 of rotation under external pressure uniformly applied along the parallel circle.

SOURCE: AN SSSR. Doklady*, v. 151, no. 6, 1963, 1303-1305

TOPIC TAGS: stability of shells of rotation, critical load, theory of elasticity

ABSTRACT: The author calculates the load leading to the loss of stability of the shell. The computation is based on the author's theory given in his book (The theory of convex elastic shells in the supercritical stage. Kharkov. 1960). The critical load Q_c is given by the formula:

$$Q_c = \frac{3\pi}{\sqrt{12}} \times \frac{E\delta^2\alpha^2}{1 - \mu^2}$$

Card 1/2

L 18960-63

ACCESSION NR: AP3006587

2

where δ is the shell thickness, α - the angle of intersection of the plane of the parallel circle with the shell surface, E - the elasticity modulus, μ - the Poisson coefficient. This result has been checked experimentally with copper 27 specimens; a good agreement with the theoretical results has been obtained. Orig. art. has: 2 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut nizkikh temperatur Akademii nauk SSSR (Low Temperature Physics-engineering Institute, Academy of Sciences, SSSR)

SUBMITTED: 17May63 DATE ACQ: 27Sep63 ENCL: 00

SUB CODE: PH NO REF SOV: 001 OTHER: 000

Card 2/2

YEFIMOV, N.V.; ZALGALLER, V.A.; POGORELOV, A.V.

Aleksandr Danilovich Aleksandrov; on his 50th birthday. Usp. mat.nauk 17 no.6:172-184 N-D '62. (MIRA 16:1)
(Aleksandrov, Aleksandr Danilovich, 1912-)

POGORELOV, A.V.

Transcritical deformations of shells of limited elasticity. Dokl. AN SSSR 149 no.4:806-807 Ap '63. (MIRA 16:3)

1. Fiziko-tekhnicheskiy institut nizkikh temperatur AN UkrSSR. Chlen-korrespondent AN SSSR.

(Elastic plates and shells)

POGORELOV, A.V.

Lower critical load for cylindrical shells. Dokl. AN SSSR 149 no.5:1047-1048 Ap '63. (MIRA 16:5)

1. Fiziko-tekhnicheskiy institut nizkikh temperatur AN UkrSSR. Chlen-korrespondent AN SSSR.

(Elastic plates and shells)

S/020/63/149/004/008/025
B104/B186

AUTHORS: Pogorelov, A. V., Corresponding Member of the AS USSR

TITLE: Transcritical deformations of finitely elastic shells

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 149, no. 4, 1963, 806 - 807

TEXT: The author discusses results of one of his papers (K teorii vypuklykh uprugikh obolochek v zakriticheskoy stadii - On the theory of convex elastic shells in the transcritical range, Izd. Khar'kovsk. gos. univ., 1960) in which it is shown that transcritical deformation of finitely elastic shells is more difficult than transcritical deformation of an infinitely elastic shell. A fin formed on the shell surface due to transcritical deformation is fixed at the moment when the bending stresses exceed the elasticity limit and a high deformation energy is needed to shift this fin. Formulas for the lower critical pressure acting on sufficiently thin shells are discussed.

Card 1/2

Transcritical deformations of ... S/020/63/149/004/008/025
B104/B186

ASSOCIATION: Fiziko-tekhnicheskiy institut nizkikh temperatur Akademii nauk USSR (Physicotechnical Institute of Low Temperatures of the Academy of Sciences UkrSSR)

SUBMITTED: November 14, 1962

Card 2/2

PHASE I BOOK EXPLOITATION JUN 25 1963 SOV/6321

Pogorelov, Aleksey Vasil'yevich

Tsilindricheskiye obolochki pri zakriticheskikh deformatsiyakh [chast' 2]: Vneshneye davleniye (Post-Buckling Behavior of Cylindrical Shells. pt. 2: External Pressure). Khar'kov, Izd-vo Khar'kovskogo univ., 1962. 60 p. 3000 copies printed.

Resp. Ed.: Ya. P. Blank, Professor; Ed.: A. N. Tret'yakova; Tech. Ed.: G. P. Aleksandrova.

PURPOSE: The book is intended for a broad circle of readers familiar with fundamentals of the shell theory and differential geometry. It can be useful to designers, students, and scientific workers in the field of shell design.

COVERAGE: The post-buckling behavior and equilibrium of a thin cylindrical shell under external pressure is analyzed by a method different from that used by other authors. Particularly, the lower critical pressure is determined. This book is a continuation

Card 1/2

SOV/6321

of a previous publication of the author on post-buckling of cylindrical shells under axial pressure. The buckling process is viewed as a geometric flexure and as a development of the wave-forming process on the shell surface. No personalities are mentioned. There are no references.

TABLE OF CONTENTS:

Card 2/2